Physical validation: paradigm

➢Identification of the principal physical-driven components affecting algorithms ➔ cross-talk with developers➔ how is the physical process described in the instrument retrievals; which basic assumptions are done?

➢ Which are the measurements we can benefit from?
 ➔ innovation (in measurement type/data analyses)
 ➔ independent observations: because problems are tipycally highly uncontrained we should head toward as many independent obs as possible to avoid 'tuning' of the modeling (if I match 183 but not 150 and 89 GHz there is something missing)
 ➔ isolation of the problem (e.g. snow emissivity problem, Finland)

➢Optimal observation strategy: how long and where should we perform such measurements?

➢Feedback to modeling: can we identify biases or reduce the rms in the error of the algorithm?

Example I: the bright band

Identification of issue: DPR and GMI retrievals are affected by exctinction enhancements.

Background: is there a consensus bright band modelling for all frequencies we are heading for? Which is the bright band modelling actually implemented and by whom? Are we using the same assumptions for GMI and DPR? (Japan, US)

How to go forward by GV: which are the measurements that can substantially improve our knowledge about this issue? (e.g. a ground-based radiometer + a multiwavelength radars, optimal the one under development form NASA)

Example II: DSD assumption

Identification of issue: DPR is intended to retrieve DSDs but this requires additional constraints.

Background: which is the current assumptions for the DSDs? Is this regional dependent? (Japan, US)

How to go forward by GV: which are the measurements that can substantially improve our knowledge about this issue?
Many (Ebert, Walt/Mathew, Baldini, Bonn, are proposing polarimetric X/C band to study such a-priori covariance matrix.

Issues on the table

snow radiative properties/bulk layer radiative properties
(Canada,Finland, Japan)
ice vs liquid, rain efficiency,
 details of ice particle properties
Spatial characteristics of different precipitating systems
CRM versus CFAD/pdfs
CRM ➔ sensitivity studies:what does make sense?